Supplementary Data for

Neural bases of selective attention in action video game players

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Functional Connectivity Analysis: A functional connectivity analysis was performed to extract networks associated with the fronto-parietal network of areas highlighted by the contrast between the high and low load conditions. The aim was to characterize the network of areas connected to these main regions of interests, and to compare their functional connectivity across our two groups of interest, VGPs and NVGPs.

Frontal and parietal regions that survived the fMRI thresholding were used as ROIs (see Table 1) and included the Right Middle Frontal cortex, the Dorsal Anterior Cingulate cortex (left and right collapsed in one region), the Inferior Parietal sulcus (left and right) and the Superior Parietal sulcus (left and right). The seed regions were defined by projecting these ROIs as defined by activation in NVGPs from the MNI152 atlas space in which these regions were found to be recruited across groups back to each subject's native space. The average time series from these seed regions were extracted using all runs and conditions. Each of the averaged individual time-series was used as a regressor to model the activation in the rest of the brain voxels. FSL's FEAT toolbox was used to perform the regression analysis using the GLM. In order to regress out effects due to physiological noise and other stray noise sources, the global time-series, averaged white matter time-series as well as averaged CSF time-series were included as nuisance co-variates to the GLM.

The functional connectivity analysis was carried out in three stages as with the fMRI data in the main manuscript. In the first level, the regression was carried out on each individual run for all the subjects followed by registration to standard space (MNI-152) using FLIRT. The parameter maps were combined for all the runs in each subject to obtain a single map for each subject. The second level analysis combined all the NVGPs into one group and VGPs into second group. Parameter maps were obtained for within-group regression analysis using all 12 subjects in the NVGP group and 12 subjects in VGP group. In the third level, a between group (NVGP vs VGP) analysis was carried out where the difference in the regression between the two groups were studied. The z-stats maps were thresholded at $Z > 3.0$ and corrected for cluster significance

threshold of p=0.05. Contrast masking was used here to avoid any new networks becoming active other than those present in any of the within-group analysis.

The patterns of connectivity observed were then decomposed into anatomically defined regions of interest based on Tzourio-Mazoyer atlas as described in the fMRI data analysis section. The analysis was repeated for each seed region. No main group difference in connectivity was observed when seeding from parietal regions. In contrast, the two frontal regions led to a network of areas with significant greater connectivity in VGPs than in NVGPs. These areas are summarized in the Supplementary Data Tables 1 and 2 below.

Supplementary Data Table 1
Areas showing group differences in functional connectivity when seeded from the dorsal anterior cingulate.

| ROI | Hemi | NVGP > VGP | | | | | VGP > NVGP | | | | |
		X	Y	Z	Max Z	Volume (mm^3)	X	Y	Z	Max Z	Volume (mm^3)
Frontal											
Frontal Polar	L						-30	42	18	4.44	1567
	R						28	48	18	4.73	1640
SFS											
anterior	L						-22	8	60	4.44	480
	R						22	10	57	3.75	240
posterior	L										
	R						19	-14	74	3.73	80
Orbitofrontal	L	-28	47	-17	3.31	32					
	R										
Precentral Sulcus	L										
	R						36	3	48	4.32	1824
Inferior Frontal (Triangularis)	L	-36	27	8	3.39	24					
	R										
Insula	L	-30	27	8	3.39	160	-38	5	0	4.05	1176
	R						41	-1	7	4.53	624
Central Sulcus	L										
	R						-35	-23	63	4.32	1352

SMA	L			-3	-11	54	4.35	888
	R			7	-11	51	4.09	584
Cingulate Gyrus	L			-8	-14	44	4.73	1640
	R			7	-16	45	4.53	1280
Parietal								
Postcentral Gyrus	L			-42	-29	50	5.26	6920
	R			45	-26	50	4.46	3024
SMG/Parietal Operculum	L			-58	-22	22	5.02	3712
	R			60	-22	22	5.36	4456
Superior Parietal	L			-16	-45	65	4.27	1168
	R			16	-44	68	3.87	312
Subcortical								
Putamen	L			-25	1	0	4.07	896
	R			29	0	-1	4.06	1480

Supplementary Data Table 2
Areas showing group differences in functional connectivity when seeded from the right middle frontal gyrus (TPJ = Temporal Parietal Junction).

| ROI | Hemi | NVGP > VGP | | | | | VGP > NVGP | | | | |
		X	Y	Z	Max Z	Volume (mm^3)	X	Y	Z	Max Z	Volume (mm^3)
Frontal											
Frontal Polar	L						-28	38	18	4.51	1712
	R						30	44	16	5.09	3488
SFS	L						-20	6	56	4.41	160
	R						23	15	57	3.93	416
Insula											
anterior	L						-36	18	-6	4.98	2000
	R						38	26	-6	3.98	760
posterior	L						-36	-4	8		1000
	R						38	0	8		760
Precentral Sulcus	L						-54	-4	46	4.62	808
	R										
Cingulate Gyrus	L						-12	-24	40	4.35	528
	R						7	-1	36	4.11	1256
Parietal											
Postcentral Gyrus	L						-54	-23	37	5.07	5056
	R						52	-13	42	5.15	4120

SMG/Parietal Operculum	L						-60	-26	16	3.74	32
	R										
Superior Parietal											
medial	L						-9	-47	54	3.42	96
	R	5	-71	58	3.13	16	3	-46	52	3.45	72
lateral	L						-23	-51	67	3.47	128
	R										
TPJ	L										
	R						56	-41	17	4.35	816
Subcortical											
Putamen	L						-31	3	4	3.03	24
	R						34	0	7	3.75	32